



# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Value Engineering Award Project Overview

### **State where Project is located:**

State of California, County of Ventura, Communities of Mussel Shoals and La Conchita

### **Name of Project:**

Ventura 101 Improvements—Mussel Shoals to La Conchita

### **Agency Nominated:**

California State Department of Transportation, District 7

### **Contact Person:**

George Hunter, P.E., CVS, Chief, Value Analysis Branch  
Design Division, Caltrans HQ; Phone: 916-653-3538; FAX 916-653-1527

### **Other Participating Parties:**

Value Management Strategies, Inc.; Fraser Engineering, Inc.; Regional Transportation Improvement Program; Interregional Transportation Improvement Program; Ventura County Transportation Commission.

### **Category of Award Nomination:**

Design Engineering—Most Value Added



# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Study Performance vs. Most Value Added Award Evaluation Criteria

### Total Dollar Amount Saved (Including Life Cycle Cost Analysis If Applicable)

- Initial (Capital) Cost Savings--**\$14,830,000**, and Life Cycle Cost Savings--**\$15,676,000**

### Percentage (%) Of Total Project Cost Saved Through The Use Of VE

- VE Proposal reduces project cost by **53%**

### The Increased Value Of The Project

- VE Proposal increases Value by **149%** and improves Performance by **17%**

(See Performance Rating Matrix)

### Annual Savings (Operations, Maintenance, Etc)

- VE Proposal Annual Savings **\$846,000**

### Reduction In Schedule

- VE Proposal reduces Project Schedule by **6 months**



# Ventura-101 Improvements From Mussel Shoals To La Conchita



## **Brief Project/Proposal Description**

Safety is the main issue for this project. Recent accidents near the median openings have the residents requesting improvements in the area. The four main issues regarding the project are:

- Safety issues posed by allowing left-turn movements to and from the expressway at Mussel Shoals and La Conchita, and U-turn movements at Tank Farm.
- Improvements and upgrades to the on- and off-ramps at Mussel Shoals and La Conchita.
- Pedestrians crossing to access the beach.
- Increased mobility and direct access between the communities of Mussel Shoals and La Conchita.

During peak hours, when traffic volumes are high, left-hand movements on and off the expressway are difficult to make. Motorists are waiting longer in order to make these movements. Also, existing median lanes and on-/off-ramps at Mussel Shoals, La Conchita, and Tank Farm do not meet the current Highway Design Standards.

There is no direct access or connection between the two communities for local circulation. La Conchita has no direct access to the beach, and pedestrians are crossing the four-lane expressway to access the beach. Crossing a high-speed facility on foot is an undesirable movement. The La Conchita Community has requested a pedestrian under-crossing to access the beach. Both a pedestrian under-crossing and pedestrian over-crossing are being considered for this project.

This project proposes to improve safety by upgrading the existing divided expressway facilities on State Route 101 (from KP 64.0 to KP 69.4) located in the County of Ventura, and in the vicinity of the communities of Mussel Shoals, La Conchita, and Tank Farm. Draft Project Report Alternative 2 is the baseline for the VA Study.

### **Original Concept**

- Close the median's openings at the communities of Mussel Shoals, La Conchita, and Tank Farm to eliminate left-hand turning movements on and off of State Route 101.
- Upgrade the on- and off-ramps at Mussel Shoals and La Conchita to provide longer accelerating and decelerating lanes using retaining walls.
- Construct a grade-separated pedestrian crossing to provide beach access from the community of La Conchita. A pedestrian under-crossing is in the original concept, but a pedestrian over-crossing is being considered as an option.
- Connect the communities of Mussel Shoals and La Conchita with a new frontage road and a below-grade under-crossing (i.e., vehicular tunnel) at Ocean Avenue

The cost of the original concept is \$28,030,000.



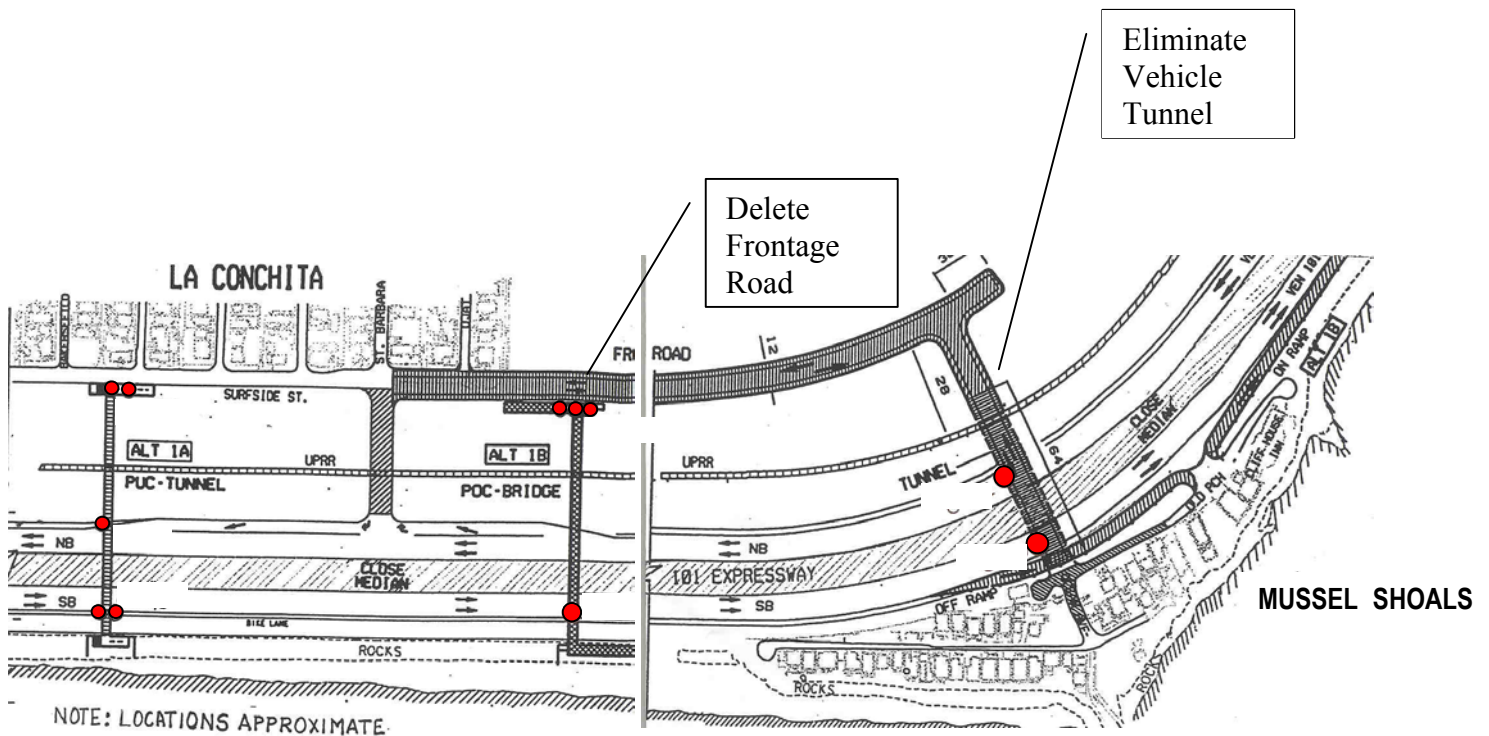
# Ventura-101 Improvements From Mussel Shoals To La Conchita



## VA Study Proposed Concept

Close the median at Mussel Shoals, La Conchita, and Tank Farm north of La Conchita. Shift the southbound lanes toward the median at the Mussel Shoals curve and improve (extend) the on and off ramp configuration at Mussel Shoals. **Eliminate bridge undercrossing (vehicle undercrossing) at Mussel Shoals at the end of Ocean Road and the frontage road from La Conchita to the proposed undercrossing to Mussel Shoals.**

The revised project scope still fully satisfies the safety concerns that initiated the project, while the **Accepted Alternative** adds value and minimizes the project cost. Eliminating the vehicle undercrossing reduces O&M costs by \$846,000. **The result of this change reduces project cost by 53% (\$14,830,000), improves Performance by 17% and increases Value by 149%.**





# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Project Analysis and Proposed Alternatives

The VA study purpose was to provide an independent assessment of the alternatives presented in the Draft Project Report, Alternative 2, described above.

## Summary Of Analysis

The following analysis tools were used to study the project:

- ♦ Project Issues
- ♦ Site Visit Observations
- ♦ Cost Model
- ♦ Function Analysis / FAST Diagram
- ♦ Performance Criteria Matrix
- ♦ Performance Rating Matrix

The VA team analyzed the project using Value Analysis tools and followed Caltrans' VA job plan. Using the Function Analysis System Technique (FAST) diagramming, the team defined the basic function of this project as **Improve Safety**, but found that a subordinate function, **Reduce Travel (Out-of-Direction)**, accounted for over 50% of the project cost. This analysis of the functions helped the team focus on crafting alternative concepts that would provide the required functions to satisfy the purpose and need of the project. Subsequently, the team developed specific performance criteria in cooperation with the designers and stakeholders. These criteria were weighted, using a paired comparison approach that resulted in the criteria being used to concretely evaluate ideas and alternative concepts.

## Cost Model

The VA team leader prepared a cost model from the designer's cost estimates. The cost model clearly showed the cost drivers for the project and was used to guide the VA team during the VA Study.

- ♦ **Approximately 50% of the estimated project costs are for connecting the communities to reduce out-of-direction travel for the local residents.** Approximately 42% is for closing the median and improving acceleration and deceleration lanes to improve safety, and 8% is for the pedestrian undercrossing to access the beach.
- ♦ The structural portion of the cost estimates shows the cost of the undercrossing and overcrossing to be virtually the same. However the VA team identified significant added costs for the pedestrian undercrossing for such items as roadway excavation, roadway embankment, AC pavement, aggregate base for the detour, drainage, k-rail, traffic control, and other costs related to the construction of the pedestrian undercrossing.



# Ventura-101 Improvements From Mussel Shoals To La Conchita

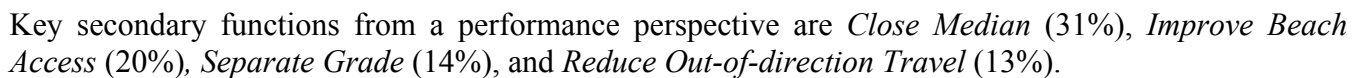


## Cost Model

### Ventura 101 Improvements - Mussel Shoals to La Conchita

Item	Quantity	Unit	Unit Price	Cost	% of Estimated Items
<b>Earthwork</b>					
Earthwork - Roadway	1	LS	\$513,015	\$513,015	3.4%
Earthwork - Tunnel Detour	1	LS	\$61,275	\$61,275	0.4%
Earthwork - PUC	1	LS	\$223,875	\$223,875	1.5%
Demo median	1	LS	\$200,000	\$200,000	1.3%
<b>Total Earthwork</b>				<b>\$998,165</b>	<b>6.6%</b>
<b>Structural Section</b>					
AC/AB (Travelway)	1	LS	\$183,485	\$183,485	1.2%
AC/AB (Shoulder)	1	LS	\$73,025	\$73,025	0.5%
AC/AB (Median/Ramps)	1	LS	\$869,415	\$869,415	5.8%
AC/AB (Tunnel Detour)	1	LS	\$496,815	\$496,815	3.3%
<b>Total Structural Section</b>				<b>\$1,622,740</b>	<b>10.7%</b>
<b>Drainage</b>					
Drainage Facilities - Vehicle Tunnel	1	LS	\$685,000	\$685,000	4.5%
<b>Total Drainage</b>				<b>\$685,000</b>	<b>4.5%</b>
<b>Specialty Items</b>					
Tunnel wing wall	1	LS	\$384,000	\$384,000	2.5%
Tunnel Electrical	1	LS	\$100,000	\$100,000	0.7%
Construction Items	1	LS	\$1,020,100	\$1,020,100	6.8%
Haz. Waste Mitigation Work	1	LS	\$500,000	\$500,000	3.3%
Landscaping	1	LS	\$50,000	\$50,000	0.3%
Environmental Mitigation	1	LS	\$900,001	\$900,001	6.0%
SWPP	1	LS	\$1,200,000	\$1,200,000	7.9%
<b>Total Specialty Items</b>				<b>\$4,154,101</b>	<b>27.5%</b>
<b>Traffic Items</b>					
Construction Items	1	LS	\$2,170,000	\$2,170,000	14.4%
Signing and Striping	1	LS	\$120,000	\$120,000	0.8%
<b>Total Traffic Items</b>				<b>\$2,290,000</b>	<b>15.2%</b>
<b>Subtotal</b>				<b>\$9,750,006</b>	
Minor Items (1)	15%	%	\$9,750,006	\$1,462,501	
Roadway Mobilization (1)	10%	%	\$11,212,507	\$1,121,251	
Roadway Addit. Suppl. (1)	10%	%	\$12,333,758	\$1,233,376	
Roadway Addit. Conting. (1)	20%	%	\$12,333,758	\$2,466,752	
<b>Total Roadway Items</b>				<b>\$16,033,885</b>	
<b>Structures</b>					
Vehicle Tunnel	1	LS	\$2,406,400	\$2,406,400	15.9%
Retaining Walls	1	LS	\$193,500	\$193,500	1.3%
Pedestrian UC	1	LS	\$1,256,000	\$1,256,000	8.3%
Pumping Plant for Tunnel	1	LS	\$1,000,000	\$1,000,000	6.6%
<b>Total Structures</b>				<b>\$4,855,900</b>	<b>32.1%</b>
<b>Escalation (16.46%)</b>	16.46%	%	\$20,889,785	\$3,438,459	
<b>Subtotal Construction Cost</b>				<b>\$24,328,243</b>	
<b>Railroad Relocation</b>	1	LS	\$500,000	\$500,000	3.3%
<b>TOTAL COST (NIC Support)</b>				<b>\$24,828,243</b>	100.0%







# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Development of VA Alternatives

The ideas generated by the VA team were carefully evaluated using project-specific criteria applied to each idea to assure an objective evaluation.

## Performance Criteria

The VA team used the paired comparison method to prioritize the key performance criteria for this project:

- Safety
- Emergency Vehicle Access
- Highway Operations
- Local Operations
- Compatibility with Ultimate Project
- Beach Access
- Community Impact
- Commercial Impact
- Maintenance
- Aesthetics
- Parking

The team asked stakeholders and designers to help develop these criteria so that the evaluation would reflect their specific requirements. Refer to the Project Analysis – Performance Criteria Matrix section of the report for further details. *The top seven criteria were used in the Idea Evaluation forms.*

## Evaluation Process

The VA team generated and evaluated ideas on how to perform the various functions. Then, ideas were grouped by function or major project elements and evaluated as related to grouped functions.

The team compared the ideas with the original concept for each performance criterion to determine which were better than, equal to, or worse than the original concept ideas. The team then agreed on the ranking of ideas. High-ranked ideas would be developed further; low-ranked ones would be dropped from further consideration.

## Idea Evaluation Forms

All of the ideas that were generated during the creative phase using brainstorming techniques were recorded on Idea Evaluation forms. These ideas were discussed and the advantages and disadvantages of each were listed.

## Performance And Value Improvements

Performance Measures are an integral part of the Caltrans VA process. They must be well defined and agreed to by the stakeholders at the start of the VA study, as they are used throughout the study to identify, evaluate, and document alternatives. [They are also used to report performance and value improvements at the end of the VA Study.](#)





# Ventura-101 Improvements From Mussel Shoals To La Conchita



When implementation decisions were concluded, the PDT evaluated the overall project with the accepted alternatives incorporated. Comparing the ratings, score, and value index for this group of alternatives to the baseline designs, the PDT determined the relative improvements to the project that result from the VA alternatives.

The Rationale for Change in Performance and Value for the Accepted Alternatives and the Performance Rating Matrix follow.

PERFORMANCE CRITERIA MATRIX <i>Ventura 101 Improvements - Mussel Shoals to La Conchita</i>											Caltrans		
											TOTAL	%	
Parking	A	b	c	d	e	f	g	h	i	j	k	0.0	0.0%
Safety	B	b	b	b	b	b	b	b	b	b	b	10.0	18.0%
Highway Operations	C	c	c	c	c	c	c	c	c	j	c	8.0	15.0%
Local Operations	D	d/e	d	d	d	d	d	d	d	j	k	5.5	10.0%
Beach Access	E	e	e	e	e	e	e	e	e	j	k	5.5	10.0%
Maintenance	F	f	f	f	f	f	g	h	i	j	k	1.0	2.0%
Aesthetics	G	g	g	g	g	g	h	h	g	j	k	3.0	5.0%
Community Impact	H	h	h	h	h	h	h	h	h	j	k	4.0	7.0%
Commercial Impact	I	i	i	i	i	i	i	i	i	j	k	2.0	4.0%
Emergency Vehicle Access	J	j	j	j	j	j	j	j	j	j	j	9.0	16.0%
Compatibility with Ultimate Project	K	k	k	k	k	k	k	k	k	k	k	7.0	13.0%
											55.0	100%	



# Ventura-101 Improvements From Mussel Shoals To La Conchita



The definitions of the performance criteria used are identified below.

Performance Criteria	Definition
<b>Safety</b>	A measure of how the concept will work towards reducing not only the number of accidents, but also the severity of accidents, within the project area.
<b>SR 101 Highway Operations</b>	Impact that the changes will have on SR 101 operations. This impact is based on the ease of merging into traffic and exiting from the mainline based on the length of the acceleration and deceleration lanes and geometry of the lanes.
<b>Local Traffic Operations</b>	Time to access and exit the freeway, traveling in the desired direction, from Mussel Shoals and La Conchita.
<b>Beach Access</b>	Safety and convenience of accessing the beach from La Conchita. Need to consider elderly and disabled personnel.
<b>Maintenance</b>	Added annual and periodic maintenance cost over existing conditions.
<b>Aesthetics</b>	Visual impacts of project changes.
<b>Community Impact</b>	Impact to community character and quality of life due to traffic.
<b>Commercial Impact</b>	Loss of business income or jobs due to change.
<b>Emergency Vehicle Access</b>	Potential increase in response time of emergency vehicles due to changing current access configuration.
<b>Compatibility with Ultimate Configuration</b>	Amount of throwaway costs associated with the change to the eventual to the ultimate configuration.



# Ventura-101 Improvements From Mussel Shoals To La Conchita



PERFORMANCE RATING MATRIX												Caltrans	
Ventura 101 Improvements - Mussel Shoals to La Conchita													
Criteria	Criteria Weight	Concept	Performance Rating										Total Performance
			1	2	3	4	5	6	7	8	9	10	
Safety	18	Baseline - DPR 2 POC						6					108
		VA Alt 1.1							7				126
Highway Operations	15	Baseline - DPR 2 POC							7				105
		VA Alt 1.1								8			120
Local Operations	10	Baseline - DPR 2 POC					5						50
		VA Alt 1.1	1										10
Beach Access	10	Baseline - DPR 2 POC						6					60
		VA Alt 1.1						6					60
Maintenance	2	Baseline - DPR 2 POC			3								6
		VA Alt 1.1								8			16
Aesthetics	5	Baseline - DPR 2 POC					5						25
		VA Alt 1.1					5						25
Community Impact	7	Baseline - DPR 2 POC			3								21
		VA Alt 1.1				4							28
Commercial Impact	4	Baseline - DPR 2 POC					5						20
		VA Alt 1.1			3								12
Emergency Vehicle Access	16	Baseline - DPR 2 POC								8			128
		VA Alt 1.1								8			128
Compatible with Ultimate Alignment	13	Baseline - DPR 2 POC	1										13
		VA Alt 1.1								8			104
Overall Performance		Total Performance	% Performance Improvement			Total Cost		Value Index (P/C)		% Value Improvement			
Baseline - DPR 2 POC		536				\$28.0		19.14					
VA Alt 1.1 - Delete Vehicle Undercross		629	17%			\$13.2		47.65		149%			



# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Rationale for Change in Performance and Value – Accepted Proposal

Performance Criteria	VA Alternative 1.1 Delete Vehicle Undercrossing
Safety	Reduces traffic entering and leaving freeway at the Mussel Shoals ramps, which cannot be designed to current standard and are located on a curve.
Highway Traffic Operations	Reduces traffic volume entering and leaving at the Mussel Shoals ramps, which are not designed to current standards.
Local Traffic Operations	Significantly increases out-of-direction travel.
Beach Access	No change.
Maintenance	Eliminates significant maintenance associated with the vehicle undercrossing.
Aesthetics	No significant change.
Community Impact	Greatly reduces the impact to Mussel Shoals from added traffic. Increases difficulty accessing both Mussel Shoals and La Conchita.
Commercial Impact	Added out-of-direction travel for northbound traffic to Mussels Shoals and southbound traffic to La Conchita could have added impact to local businesses.
Emergency Vehicle Access	Emergency access will be maintained through the median. No loss of emergency vehicle access will result from closing the median to public traffic.
Compatibility with Ultimate Alignment	Minimal throwaway costs with this configuration.



# Ventura-101 Improvements From Mussel Shoals To La Conchita



## VA Team Alternative Proposals

The VA team developed three alternatives (1.1, 1.2, and 1.3) *all related to eliminating the vehicle tunnel* that was part of the original concept in order to reduce out-of-direction travel. The VE Team questioned the feasibility of the vehicular tunnel due to high groundwater, which is brackish and presents a high probability of contamination from years of oil production in this area. These factors complicate groundwater pumping and maintenance. The pumping operation was projected to be 24 hours a day.

## Implemented Alternative And Results

Of the alternatives proposed, Alternative 1.1 - *Delete the Vehicle Under-crossing*, was accepted. Though the vehicle tunnel reduces out of direction travel for local residents, it is not considered feasible because it would have numerous long-term negative impacts. In addition Mussel Shoals is a very compact community and both the construction and operational impact of the vehicle tunnel would have a significant impact on the quality of life of the residents.

## Accepted VA Alternative

Alternative Number	Description	Potential Savings (Additional Cost)	Performance
1.1	Delete Vehicle Under-crossing	\$15,414,000	+11%

In addition, the grade from the tunnel to the on-off ramp at Mussel Shoals results in difficult traffic movements for large vehicles. This tunnel is not compatible with the ultimate 6-lane configuration with a full interchange that meets current Caltrans standards (Draft Project Report Alternative 4). This alternative also eliminates the frontage road from La Conchita to the proposed under-crossing to Mussel Shoals. Travel for local residents of La Conchita and Mussel Shoals increases ~4 miles per trip due to out-of-direction travel required.

The revised project scope still fully satisfies the safety concerns that initiated the project, while the **Accepted Alternative** adds value and minimizes the project cost. Eliminating the vehicle under-crossing reduces O&M costs by \$846,000. **The result of this change reduces project cost by 53% (\$14,830,000), improves Performance by 17% and increases Value by 149%.**



# Ventura-101 Improvements From Mussel Shoals To La Conchita



SUMMARY OF VA ALTERNATIVES <i>Ventura 101 Improvements – Mussel Shoals to La Conchita</i>		Caltrans	
Number	Description	Potential Savings (Initial / LCC)	Performance

1.1	Delete Vehicle Undercrossing	\$14,468,000 \$15,414,000	+11%
1.2	Extend Frontage Road to Existing SR 1 (Pacific Coast Highway)	\$8,004,000 \$8,850,000	+22%
1.3	Overhead U-Turn Structure	\$8,741,000 \$9,587,000	+9%
2.0	Use Pedestrian Undercrossing with Access between Railroad and SR 101	(\$2,299,000)	+9%

## Rejected VA Alternatives

Alternative Number	Description	Reason for Rejection
1.2	Extend Frontage Road to Existing SR 1	Rejected in favor of Alternative 1.1. Significant environmental and archeology issues.
1.3	Overhead U-Turn Structure	Rejected in favor of Alternative 1.1. Significant environmental and archeology issues.





# Ventura-101 Improvements From Mussel Shoals To La Conchita



## Analysis of VA Alternatives

The results of this study were presented as individual alternatives to the original concept. In addition, design suggestions for improving the project were included for consideration by the stakeholders.

Each alternative consisted of a summary of the original concept, a description of the suggested change, a cost comparison, a listing of its advantages and disadvantages, and a brief narrative comparing the original design with the alternative. Sketches and calculations were also presented. The cost comparisons reflect the comparable level of detail as in the original estimate.

The following 8 pages contain the summary analysis and disposition of the alternative proposal accepted by the stakeholders for this project. They appear as the pages were originally prepared by the VA team, and any changes to the cost or performance measures are documented on page 8 in the Implementation Action form at the end of the alternative.



VALUE ANALYSIS ALTERNATIVE Ventura 101 Improvements – Mussel Shoals to La Conchita			Caltrans	
FUNCTION: Reduce Out-of-Direction Travel			IDEA NO. 1	NUMBER 1.1
TITLE: Delete Vehicle Undercrossing				PAGE NO. 1 of 7
<p><b>ORIGINAL CONCEPT:</b></p> <p>Close median at Mussel Shoals, La Conchita, and Tank Farm north of La Conchita. Construct a bridge undercrossing (vehicle undercrossing) at Mussel Shoals at the end of Ocean Road. Extend frontage road from La Conchita to the south to the Mussel Shoals undercrossing. Shift the southbound lanes toward the median. Improve (extend) the on- and off-ramp configuration at Mussel Shoals.</p>				
<p><b>ALTERNATIVE CONCEPT:</b></p> <p>Close the median at Mussel Shoals, La Conchita, and Tank Farm north of La Conchita. Shift the southbound lanes toward the median at the Mussel Shoals curve and improve (extend) the on and off ramp configuration at Mussel Shoals. Eliminate the frontage road from La Conchita to the proposed undercrossing to Mussel Shoals. Travel for local residents of La Conchita and Mussel Shoals increases ~4 miles per trip due to out-of-direction travel required.</p>				
<p><b>ADVANTAGES:</b></p> <ul style="list-style-type: none"><li>♦ Reduces construction cost</li><li>♦ Avoids maintenance cost of tunnel</li><li>♦ Reduces traffic volume on ramps that are not optimum</li><li>♦ Avoids degradation of quality of life in Mussel Shoals</li><li>♦ Reduces traffic in Mussel Shoals</li><li>♦ Reduces construction time and community impact during construction</li></ul>			<p><b>DISADVANTAGES:</b></p> <ul style="list-style-type: none"><li>♦ Out-of-direction travel remains for southbound 101 to and from La Conchita</li><li>♦ Out-of-direction travel remains for Mussel Shoals to and from northbound 101</li><li>♦ Added travel time for local residents, due to out-of-direction travel</li></ul>	
COST SUMMARY	Initial Cost	Present Value Subsequent Cost	Present Value Highway User Cost	Net Present Value
Original Concept	\$ 25,557,000	\$ 846,000	\$ 0	\$ 26,403,000
Alternative Concept	\$ 10,989,000	\$ 0	\$ 0	\$ 10,989,000
Savings	\$ 14,568,000	\$ 846,000	\$ 0	\$ 15,414,000
Team Member: Team		Discipline: All		PERFORMANCE: +11%

<b>VALUE ANALYSIS ALTERNATIVE</b> <i>Ventura 101 Improvements – Mussel Shoals to La Conchita</i>		<b>Caltrans</b>	
<b>TITLE:</b> Delete Vehicle Undercrossing		<b>NUMBER</b> 1.1	<b>PAGE NO</b> 2 of 7
<p><b>DISCUSSION / JUSTIFICATION:</b></p> <p>The feasibility of the vehicular tunnel is questionable due to high groundwater, which is brackish; there is high probability of encountering contaminants from years of oil production in this area. These factors complicate the groundwater pumping and maintenance issues. The pumping operation is expected to be 24 hours a day and cannot be sloped to drain to the ocean. In addition, the grade from the tunnel to the on-/off-ramps at Mussel Shoals result in difficult traffic movements for large vehicles. This tunnel is not compatible with the ultimate six-lane configuration with a full interchange that meets current Caltrans standards (Draft Project Report Alternative 4). For these reasons, and considering the high cost for an interim solution, other alternatives need to be considered.</p> <p>This forces out-of-direction travel for the local residents when the median is closed. However, this addresses the safety concerns that initiated the project.</p>			
<p><b>TECHNICAL REVIEWER COMMENTS:</b></p> <p>No comments.</p>			
<p><b>PROJECT MANAGEMENT CONSIDERATIONS:</b></p> <p>Need to assess when an ultimate widening would occur, and if this is a viable short-term solution. Highway user costs to the locals needs to be considered in the ultimate decision.</p>			

<b>PERFORMANCE MEASURES</b> <i>Ventura 101 Improvements – Mussel Shoals to La Conchita</i>		<b>Caltrans</b>	
<b>TITLE:</b> Delete Vehicle Undercrossing		<b>NUMBER</b> 1.1	<b>PAGE NO.</b> 3 of 7
<b>CRITERIA</b>	<b>Performance</b>	<b>Original</b>	<b>Alternative</b>
<b>Safety</b> Reduces traffic entering and leaving the freeway at Mussel Shoals ramps, which cannot be designed to current standard and are located on a curve.	Rating	6	7
	Weight	18	18
	Contribution	108	126
<b>Highway Traffic Operations</b> Reduces traffic volume entering and leaving at Mussel Shoals ramps, which are not designed to current standards.	Rating	7	8
	Weight	15	15
	Contribution	105	120
<b>Local Traffic Operations</b> Significantly increases out-of-direction travel.	Rating	5	1
	Weight	10	10
	Contribution	50	10
<b>Bench Access</b> No change.	Rating	6	6
	Weight	10	10
	Contribution	60	60
<b>Maintenance</b> Eliminates significant maintenance associated with a vehicle undercrossing.	Rating	3	8
	Weight	2	2
	Contribution	6	16
<b>Aesthetics</b> No significant change.	Rating	5	5
	Weight	5	5
	Contribution	25	25
<b>Community Impact</b> Greatly reduces impact to Mussel Shoals from added traffic. Increases difficulty accessing both Mussel Shoals and La Conchita.	Rating	3	4
	Weight	7	7
	Contribution	21	28
<b>Commercial Impact</b> Added out-of-direction travel for northbound traffic to Mussels Shoals and southbound traffic to La Conchita could have added impact to local businesses.	Rating	5	3
	Weight	4	4
	Contribution	20	12
<b>Emergency Vehicle Access</b> Emergency access will be maintained through the median. Having a connection between communities would be a slight advantage.	Rating	8	6
	Weight	16	16
	Contribution	128	96
<b>Compatibility with Ultimate Alignment</b> Minimal throwaway costs with this configuration.	Rating	1	8
	Weight	13	13
	Contribution	13	104
<b>Total Performance:</b>		<b>536</b>	<b>597</b>
<b>Net Change in Performance:</b>			<b>+11%</b>

<b>ASSUMPTIONS &amp; CALCULATIONS</b> <i>Ventura 101 Improvements – Mussel Shoals to La Conchita</i>		<b>Caltrans</b>	
<b>TITLE:</b> Delete Vehicle Undercrossing		<b>NUMBER</b> 1.1	<b>PAGE NO.</b> 4 of 7
<p><b>Vehicle Tunnel Maintenance</b></p> <ul style="list-style-type: none"> <li>• Pump Station Annual Maintenance: 5% of initial costs (.05*\$1,000,000) = \$50,000/year</li> <li>• Oil Water Separator Maintenance: 10% Of initial costs (.10*\$100,000) = \$10,000/year</li> <li>• Power and Lighting: \$5,000/year</li> <li>• Hydrocarbons are likely to be encountered in groundwater to be pumped from the vehicle undercrossing</li> </ul> <p><b>Right-of-Way</b></p> <ul style="list-style-type: none"> <li>• Eliminate right-of-way for frontage road</li> </ul>			

COST ESTIMATE <i>Ventura 101 Improvements - Mussel Shoals to La Conchita</i>					Caltrans		
NAME: Delete Vehicle Undercrossing					ALTERNATIVE NO. 1.1 PAGE NO. 5 of 7		
CONSTRUCTION ELEMENT		ORIGINAL DESIGN Baseline PR Alternative 2			ALTERNATIVE DESIGN		
Description	Unit	Quantity	Cost/Unit	Total	Quantity	Cost/Unit	Total
ROADWAY ITEMS							
Section 1 - Earthwork				\$1,080,755			\$999,755
Roadway Excavation (cut)	m <sup>3</sup>	7,668	15	\$115,020	7,668	15	\$115,020
Roadway Embankment (fill)	m <sup>3</sup>	6,525	15	\$97,875	6,525	15	\$97,875
Detour Embankment	m <sup>3</sup>	8,400	15	\$126,000	3,000	15	\$45,000
Obliterate Surfacing	m <sup>2</sup>	40,000	5	\$200,000	40,000	5	\$200,000
Roadway Excavation (frontage)	m <sup>3</sup>	29,700	15	\$445,500	29,700	15	\$445,500
Roadway Embankment (frontage)	m <sup>3</sup>	6,424	15	\$96,360	6,424	15	\$96,360
Section 2 - Structural Section				\$1,598,880			\$968,265
Asphalt Conc. (Type C) Median/Ramps	tonne	11,170	45	\$502,650	11,170	45	\$502,650
Aggregate Base - Median and Ramps	m <sup>3</sup>	6,347	45	\$285,615	6,347	45	\$285,615
Asphalt Concrete (Type C) - NB Detour	tonne	9,240	40	\$369,600	3,000	40	\$120,000
Aggregate Base - NB Detour	m <sup>3</sup>	5,280	40	\$211,200	1,500	40	\$60,000
Asphalt Conc. (Type A) Frontage Road	tonne	2,867	45	\$129,015		45	\$0
Aggregate Base - Frontage	m <sup>3</sup>	2,520	40	\$100,800			\$0
Section 3 - Drainage				\$685,000			\$0
Erosion Control	ls	1	120,000	\$120,000			\$0
Detour Drainage	ls	1	100,000	\$100,000			\$0
Drainage and Detention Basin	ls	1	465,000	\$465,000			\$0
Section 4 - Specialty Items				\$3,470,100			\$1,170,100
Remove Double Thrie Beam Barrier	m	2,900	25	\$72,500	2,900	25	\$72,500
Concrete Barrier (Type 60)	m	3,000	200	\$600,000	3,000	200	\$600,000
Temporary K-Rail	m	6,600	35	\$231,000	6,600	35	\$231,000
Temporary Striping	m	13,200	0.50	\$6,600	13,200	0.50	\$6,600
Temporary Crash Cushions	ea	56	250	\$14,000	56	250	\$14,000
RE Office	ls	1	96,000	\$96,000	1	96,000	\$96,000
Landscaping	ls	1	50,000	\$50,000	1	50,000	\$50,000
Environmental Mitigation	ls	1	900,000	\$900,000			\$0
Hazardous Waste Mitigation	ls	1	100,000	\$100,000	1	100,000	\$100,000
SWPPP	ls	1	1,200,000	\$1,200,000			\$0
Electrical	ls	1	100,000	\$100,000			\$0
Oil/Water Separator	ls	1	100,000	\$100,000			\$0
Section 5 - Traffic Items				\$2,290,000			\$1,140,000
TMP - Management System	ls	1	1,250,000	\$1,250,000	1	600,000	\$600,000
TMP - COZEED	ls	1	200,000	\$200,000	1	200,000	\$200,000
TMP - Signs/Striping	ls	1	120,000	\$120,000	1	120,000	\$120,000
TMP - FSP	ls	1	720,000	\$720,000	1	220,000	\$220,000
Section 6 - Minor Items	%	15%	\$9,124,735	\$1,368,710	15%	\$4,278,120	\$641,718
Section 7 - Roadway Mobilization	%	10%	\$10,493,445	\$1,049,345	10%	\$4,919,838	\$491,984
Section 8 - Roadway Additions - Supp.	%	10%	\$11,542,790	\$1,154,279	10%	\$5,411,822	\$541,182
Section 9 - Roadway Additions - Cont.	%	20%	\$11,542,790	\$2,308,558	20%	\$5,411,822	\$1,082,364
ROADWAY SUBTOTAL				\$15,005,627			\$7,035,368
MARK-UP	%	Included above					
ROADWAY TOTAL				\$15,005,627			\$7,035,368



<b>COST ESTIMATE</b> <i>Ventura 101 - Mussel Shoals to La Conchita</i>					<b>Caltrans</b>		
<b>NAME:</b> Delete Vehicle Undercrossing					<b>ALTERNATIVE NO.</b> 1.1 <b>PAGE NO.</b> 6 of 7		
CONSTRUCTION ELEMENT		<b>ORIGINAL DESIGN</b> Baseline PR Alternative 2			<b>ALTERNATIVE DESIGN</b>		
Description	Unit	Quantity	Cost/Unit	Total	Quantity	Cost/Unit	Total
<b>STRUCTURE ITEMS - Vehicle Tunnel</b>							
Cut and cover tunnel	m <sup>2</sup>	832	1,865	\$1,551,313			\$0
Retaining Walls	m	550	5,929	\$3,261,200	225	5,929	\$1,334,025
Mobilization	%	<b>10%</b>	4,812,513	\$481,251	<b>10%</b>	1,334,025	\$133,403
Contingencies	%	<b>25%</b>	5,293,764	\$1,323,441	<b>25%</b>	1,467,428	\$366,857
Railroad Relocation	ls	1	500,000	\$500,000			\$0
Pumping Plant	ls	1	1,000,000	\$1,000,000			\$0
<b>STRUCTURE ITEMS - POC</b>							
POC	m <sup>2</sup>	212	2,750	\$583,000	212	2,750	\$583,000
Retaining Walls	m	71	13,500	\$958,500	71	13,500	\$958,500
Mobilization	%	<b>10%</b>	1,541,500	\$154,150	<b>10%</b>	1,541,500	\$154,150
Contingencies	%	<b>25%</b>	1,695,650	\$423,913	<b>25%</b>	1,695,650	\$423,913
<b>STRUCTURE TOTAL</b>				<b>\$10,236,768</b>			<b>\$3,953,847</b>
<b>RIGHT-OF-WAY ITEMS</b>							
Right-of-Way Acquisition	ls	1	250,000	\$250,000			\$0
Utility Relocation	ls	1	64,800	\$64,800			\$0
				\$0			\$0
				\$0			\$0
<b>RIGHT-OF-WAY TOTAL</b>				<b>\$314,800</b>			<b>\$0</b>
<b>TOTAL</b>				<b>\$25,557,195</b>			<b>\$10,989,215</b>
<b>Total (Rounded)</b>				<b>\$25,557,000</b>			<b>\$10,989,000</b>
						<b>SAVINGS</b>	<b>\$14,568,000</b>

LIFE CYCLE COSTS <i>Ventura 101 Improvements - Mussel Shoals to La Conchita</i>				Caltrans		
TITLE: Delete Vehicle Undercrossing				NUMBER 1.1	PAGE NO. 7 of 7	
Life Cycle Period	20	Years	Real Discount Rate	4.50%	ORIGINAL	ALTERNATIVE
A. INITIAL COST				\$25,557,000	\$10,989,000	
Service Life-Original	20	Years	INITIAL COST SAVINGS:		\$14,568,000	
Service Life-Alternative	20	Years				
B. SUBSEQUENT ANNUAL COSTS						
1. Maintenance and Inspection				\$60,000	\$0	
2. Operating				\$0	\$0	
3. Energy				\$5,000	\$0	
Total Subsequent Annual Costs:				\$65,000	\$0	
Present Value Factor (P/A):				13.008	13.008	
PRESENT VALUE OF SUBSEQUENT ANNUAL COSTS (Rounded):				\$846,000	\$0	
C. SUBSEQUENT SINGLE COSTS	Year	Amount	PV Factor (P/F)	Present Value	Present Value	
Rehabilitations - Original				\$0		
Rehabilitations - Alternative					\$0	
Repairs - Original				\$0		
Repairs - Alternative					\$0	
Expended Service Life - Original				\$0		
Expended Service Life - Alternative					\$0	
Salvage - Original				\$0		
Salvage - Alternative					\$0	
PRESENT VALUE OF SUBSEQUENT SINGLE COSTS (Rounded):				\$0	\$0	
D. TOTAL SUBSEQUENT ANNUAL AND SINGLE COSTS (B+C)				\$846,000	\$0	
TOTAL SUBSEQUENT COSTS SAVINGS:					\$846,000	
E. HIGHWAY USER ANNUAL COSTS				Present Value	Present Value	
1. Accident						
2. Travel Time						
3. Vehicle Operating						
TOTAL HIGHWAY USER ANNUAL COSTS:				\$0	\$0	
TOTAL HIGHWAY USER COST SAVINGS:					\$0	
F. TOTAL PRESENT VALUE COST (A+D+E)				\$26,403,000	\$10,989,000	
TOTAL LIFE CYCLE SAVINGS:					\$15,414,000	

<b>VA ALTERNATIVE IMPLEMENTATION ACTION</b> <i>Ventura 101 Improvements – Mussel Shoals to La Conchita</i>			<b>Caltrans</b>
<b>TITLE:</b> Delete Vehicle Undercrossing			<b>NUMBER</b> 1.1
<b>RESPONSES</b>	<b>Prepared by:</b> Terry Hays	<b>Date:</b> July 25, 2002	<b>DISPOSITION</b>
<i>Acceptance of alternatives denotes intent to implement, based on current information, in the given project development phase (PID, PAD or Design). It is recognized that future conditions may change this disposition. The validation of disposition, cost, and performance changes for the alternative are required by Caltrans to ensure that the project decision makers agree with the study results. Furthermore, these validated results become the basis for the VA Program reportables.</i>			
<b>Technical Feasibility / Validated Performance:</b>  This alternative is being integrated into the design. Median openings will be provided so that there is no loss of emergency vehicle response time.			<input checked="" type="checkbox"/> <b>Accept</b> <input type="checkbox"/> <b>Conditionally Accept</b> <input type="checkbox"/> <b>Reject</b>
<b>Implementable Portions:</b>  The entire concept will be implemented.			<b>Validated Performance</b>  17%
<b>Validated Cost Savings:</b>  Caltrans PDT estimate total project cost with pedestrian undercrossing to be: Without Vehicle Undercrossing:       \$13,200,000 With Vehicle Undercrossing:         \$28,030,000 Savings:                                   \$14,830,000			<b>Validated Savings</b>  \$14,830,000
<b>Schedule Impacts:</b> <input type="checkbox"/> No Change <input checked="" type="checkbox"/> Reduced by <u>  6  </u> months <input type="checkbox"/> Increased by <u>      </u> months  The elimination of the vehicle tunnel eliminates the major part of the critical path work and three or four traffic shifts. While Caltrans has not yet developed a schedule for the project, this change should reduce construction time by about six months.			
<b>Other Comments:</b>			